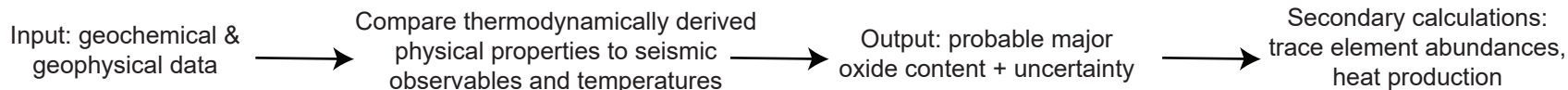


EGU21-6328: Building Compositions of the Deep Continental Crust

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"CrustMaker" *Publication in prep*



For more details, downloads, and associated publications and research, scan this code



Introduction

Debate regarding the middle and lower crust's composition abounds.

Multidisciplinary constraints needed due to nonuniqueness in geochemical and geophysical datasets.

Similar multidisciplinary methods used on smaller scale or at lower resolutions have been effective⁴.

Methods

Group similar crust types to extrapolate seismic profile or use direct profiles where available or in heavily studied regions.

Calculate probability overlap between observed seismic profiles and seismic velocities generated thermodynamically from a suite of compositions.

Uncertainties in composition, depth, and temperature propagated via Monte Carlo.

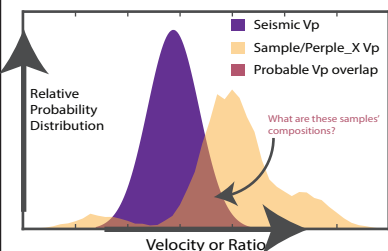


Fig. 1: Conceptual illustration of overlapping probability distributions used to identify probable crust compositions.

Results

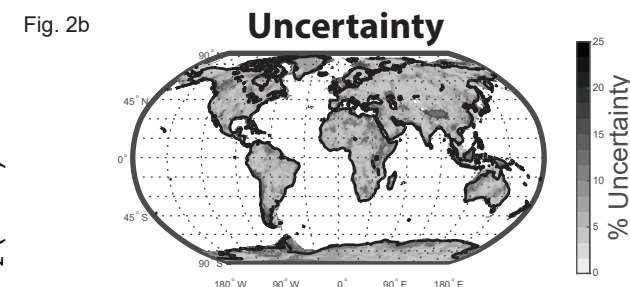
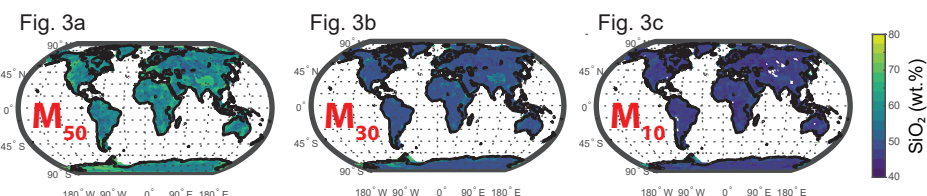
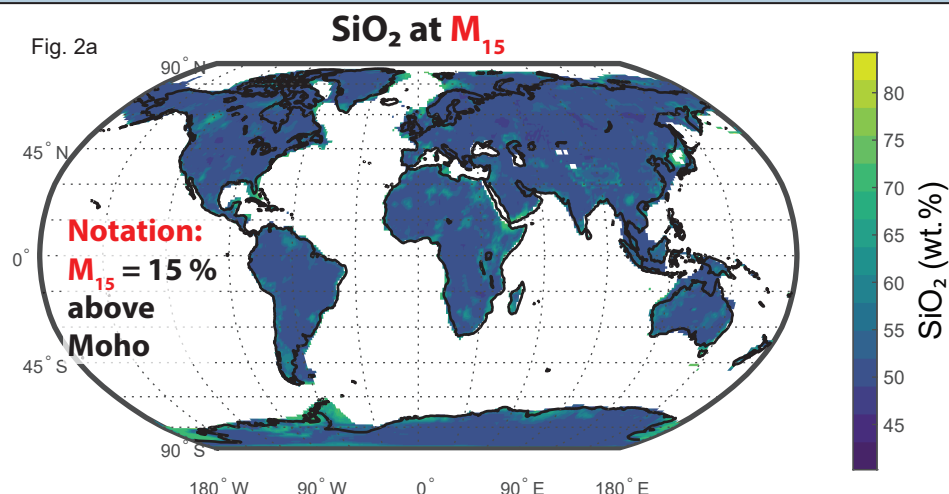
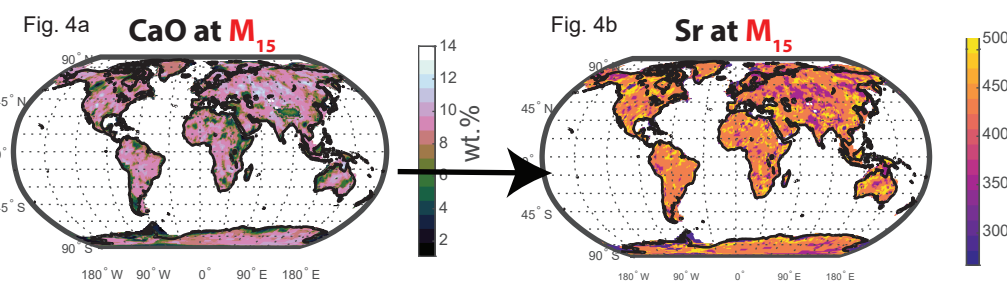
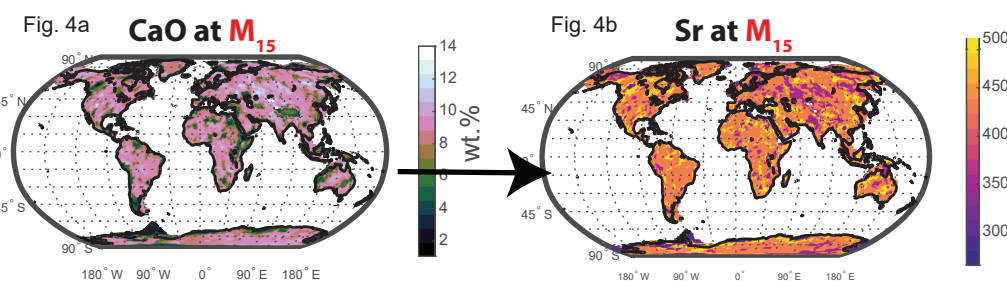


Fig. 2: (a) Global SiO₂ composition at 15 km above Moho and (b) uncertainty ranging from 5 - 20% (3 - 12 wt.% SiO₂).

Fig. 3a-c: Major oxide compositions vs. depth with uncertainty. SiO₂ generally decreases with increasing depth.

Fig. 4a-b: CrustMaker can estimate the abundance of any minor or trace element that has a quantifiable relationship to a major element via a 2-variable joint probability distribution.



Acknowledgements

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⁴ e.g. Sammon et al., 2020 and other regional studies

